Painting a Picture of Childhood Obesity with a Geographic Information System

A web-based tool for users to visualize data at local, regional, and national levels

**SUMMARY**

The Center for Applied Research and Environmental Systems at the University of Missouri (known as CARES) developed the Childhood Obesity Geographic Information System (COGIS). The University of Florida helped to develop the conceptual framework and designed a prototype of the system.

The web-based tool allows users to visualize data at local, regional, and national levels; identify relationships among obesity and numerous other factors, such as residents’ socioeconomic and health attributes, the location of fast-food restaurants, and neighborhood walkability; and produce maps, reports, and “what-if” scenarios.

For example, project staff in Chattanooga, Tenn.—working under the Robert Wood Johnson Foundation (RWJF) national program *Healthy Kids, Healthy Communities*—mapped neighborhoods affected by the closing of a grocery chain, to raise awareness of food deserts and build support for a mobile fresh food market.

“You are taking complex data and a lot of information that would take up hundreds of pages in a report…. GIS really allows you to paint a picture for everybody,” said John Bilderback, MS, who directs the Chattanooga project.

Practicable Legacy Strategies, a public policy and management consulting firm based in Philadelphia, monitored and supported the development and launch of COGIS. Community Initiatives, in Fort Collins, Colo., produced training materials for users of the system, under subcontracts from the University of Missouri–Columbia and Practicable Legacy Strategies.

**Key Results**

- The Center for Applied Research and Environmental Systems launched the COGIS website in January 2011 with thousands of layers of national, state, county, and local data on children and youth, poverty, education, civic engagement, food, health, housing, the environment, and transportation.
COGIS users include 117 staff members from RWJF, RWJF national program offices and grantees focused on childhood obesity, including Healthy Kids, Healthy Communities, New Jersey Partnership for Healthy Kids, Leadership for Healthy Communities, and the Safe Routes to School National Partnership.

Practicable Legacy Strategies developed a special issue of the American Journal of Preventive Medicine (spring 2012) on using spatial mapping to improve health and promote interdisciplinary approaches to reducing childhood obesity.

**Funding**

RWJF funded this project with seven grants totaling $1.3 million from February 2009 to September 2012. The grants included two to the University of Florida,¹ three to Practicable Legacy Strategies,² and two to the University of Missouri’s Center for Applied Research and Environmental Systems (CARES).³

**CONTEXT**

A web-based geographic information system (GIS) helps communities, policy-makers, advocates, and planners analyze the dynamic connections among people, their physical and social environment, and their health and well-being. By integrating national, state, regional, and local data, GIS transforms complex variables into a visual presentation, to identify areas of need and track the impact of evidence-based strategies.

“GIS, or computer mapping, is really about understanding people and place,” said Christopher Fulcher, PhD, co-director of CARES at the University of Missouri and project director. “The real power to make change is in the narrative.”

“We use the phrase ‘place matters,’” explained Monte Roulier, co-founder and president of Community Initiatives, which provided user support and produced the training materials. “GIS allows people to act on this notion about how we transform place…. and see the context where decisions are made.”

While GIS was widely used in business, government, and organizations working in education, science, the environment, and other fields, its use in tackling childhood obesity has been limited and poorly coordinated, according to the initial project team at the University of Florida (see The Project).

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¹ ID# 65811 (February 2009 to October 2009, $149,863); and ID# 66742 ($600,000, November 2009 to October 2010)
² ID# 66745 ($99,616, November 2009 to July 2010); ID# 67785 ($94,960, August 2010 to May 2011); and ID# 68299 ($91,524, January 2011 to May 2012)
³ ID# 68303 ($229,996, November 2010 to February 2012); and ID# 69998 ($37,522, May 2012 to September 2012)
**RWJF’s Interest in This Area**

RWJF is committed to tackling one of the most urgent threats to the health of children and families—childhood obesity. The Foundation’s goal is to reverse the childhood obesity epidemic by 2015 by changing public policies, school and neighborhood settings, and corporate practices in ways that make communities healthier—with a particular focus on increasing access to healthy, affordable foods and opportunities for physical activity.

The Foundation places special emphasis on reaching children who are at greatest risk for obesity or have limited access to healthy foods and safe places to play: African American, Latino, American Indian, and Asian/Pacific Islander children, and children living in lower-income areas. This is consistent with the vision of the Foundation’s founder and to the values of the Foundation to focus on those who are most vulnerable and in greatest need.

In 2007, RWJF began exploring GIS as a tool to halt the upward trend of childhood obesity, interviewing grantees and leaders of its national program offices. The Foundation identified nine organizations with some of the infrastructure needed to create a childhood obesity GIS, and invited them to submit proposals on the attributes, uses, timeline, and costs of a system. RWJF initially chose the University of Florida to develop it. (See The Project.)

**THE PROJECT**

The Center for Applied Research and Environmental Systems (CARES) developed the Childhood Obesity Prevention Geographic Information System. COGIS allows users to:

- Visualize data at local, regional, and national levels
- Identify relationships among obesity and numerous other factors, such as residents’ socioeconomic and health attributes, fast-food restaurants, and ease of walking
- Produce maps, reports, and “what-if” scenarios

**Planning a Childhood Obesity GIS**

The project unfolded in phases. A University of Florida team received an RWJF planning grant in 2009 to examine existing maps and databases and hold meetings and webinars, to explore the most promising architecture for a new system, and assess the needs of potential users. Under a second grant, the Florida team worked with Practicable Legacy Strategies to convene a panel of experts on the data the system should include and developed an initial prototype system.

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4 Grant ID# 65811; $149,863 from February 2009 to October 2009
5 Grant ID# 66742; $600,000 from November 2009 to October 2010
To support this work, the University of Florida team developed survey questions and worked with Practicable Legacy Strategies to survey potential users about their GIS-related priorities, capacities, and training needs. Surveyed users included RWJF grantees and representatives of the National Collaborative on Childhood Obesity Research. [In addition to RWJF, the collaborative includes the Centers for Disease Control and Prevention (CDC), the National Institutes of Health (NIH), and the U.S. Department of Agriculture (USDA).] ⁶

**Transferring the GIS to CARES**

Practicable Legacy Strategies recommended that RWJF engage CARES at the University of Missouri to complete the development of COGIS based on more advanced GIS development at CARES. The consultants then guided the transfer of the project from the University of Florida to the University of Missouri in November 2010. ⁷

> “It is not just about science and data, but people’s perceptions of childhood obesity.” —Project Director Christopher Fulcher

CARES builds and maintains databases through contracts and grants from public agencies, private foundations, and nonprofits which agree that CARES can make public data widely available free of charge through maps, reports, charts, dashboards, and animations. “What we are doing is leveraging all the previous investments and making those public data publicly accessible to all communities across the country at no cost,” said Fulcher.

CARES built the custom COGIS interface on top of its existing national GIS engine. “We already had a national system up and running,” Fulcher explained. “We didn’t build a GIS for RWJF—rather, we modified user roles for system access, pulled together more childhood obesity data, and reframed the GIS engine for COGIS users.”

Practicable Legacy Strategies monitored and supported the development of COGIS and managed its launch. ⁸ The consultants also convened the COGIS advisory council and conducted end-user surveys, which provided recommendations for improving the system and developing training materials for users. (See the Appendix for council members.)

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⁶ RWJF made two grants to Practicable Legacy Strategies to support this work: ID# 66785; $96,616 from November 1, 2009 to July 31, 2010 and ID# 67785; $91,524 from August 2010 to May 2011.

⁷ A new grant was made to the University of Missouri, ID# 68303; $229,996 from November 2010 to February 2012, and a second grant to the university, ID# 69998; $37,522 from May 2012 to July 2012.

⁸ RWJF grant ID# 68922; $384,547 from November 2011 to May 2012.
RESULTS

Project staff reported the following results to RWJF:

- CARES launched the COGIS website in January 2011 with 7,000 layers of national, state, county, and local data on children and youth, poverty, neighborhoods, education, civic engagement, food, health, housing, the environment, and transportation. CARES continued to build more national data into the system through numerous grants and contracts, with some 23,000 layers available as of February 2013.

A unique feature of COGIS is the specificity of its data. For example, in addition to county-level information, the system adds data at the census tract, block group, ZIP code, neighborhood, and building levels.

“When you have a single number for one county that has huge pockets of wealth and also very rural areas, it masks the possibilities and challenges,” Roulier noted. “We applaud working with county-level rankings, but we also need to go to neighborhood levels, we need to go to blocks, we need to go to schools.”

COGIS includes these capabilities:

- Interactive maps and dynamic reporting that allow users to highlight relationships between obesity and social, economic, demographic, and health characteristics of defined geographic areas
- Tools that allow users to upload and overlay local and regional data with national data
- Content management tools that allow each user to develop his or her own portfolio, and that promote peer learning by enabling users to highlight efforts to prevent childhood obesity in their communities
- A “collaborative management system” that allows communities to work together by sharing data, maps, and reports

- Some 117 RWJF national program offices and grantees focused on childhood obesity were using COGIS by the end of the grant period, including those working with Healthy Kids, Healthy Communities, the Safe Routes to School National Partnership, Salud America, and Active Living Research.

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9 County-level information is what the RWJF-funded project, County Health Rankings & Roadmaps, at the University of Wisconsin Population Health Institute, provides—a snapshot of the health of residents in every county nationwide, and compares each county to others. Available at www.countyhealthrankings.org. It is not a GIS system.

A survey and interviews with users by Practicable Legacy Strategies in spring 2012 validated “the critical importance of the system, its potential to significantly impact practice and policy, and the utility of some of the features, particularly the map templates and data uploading capacities,” according to the consultants.

Examples of how local coalitions funded under Healthy Kids, Healthy Communities have used COGIS show its capabilities:

— In Chattanooga, Tenn., the project team for the Healthy Kids Healthy Communities project\textsuperscript{11} used COGIS to overlay poverty areas on top of food deserts where there were no grocery stores within a one mile radius, to identify neighborhoods that would benefit most from mobile markets that offer fresh fruits, vegetables, eggs, milk, and other staples.

Based on this information, the grantee developed the Mobile Market project that services 11 areas each week with a van full of fresh fruits, vegetables, eggs, milk, and other staples. See the video about this project. Bilderback, the project director, said that the COGIS system was the most important tool he had to help with this work, according to Jamie Bussel, RWJF program officer for Healthy Kids, Healthy Communities.

— In Aberdeen, N.C., in Moore County, the project team combined data from individual walking recorders and other information available through COGIS to create a plan for expanding pedestrian access to schools, parks, and other destinations.\textsuperscript{12}

— In Greenville, S.C., the project team mapped poverty levels, food deserts, schools with high percentages of students receiving free or reduced-price lunch, and retailers serving residents who rely on food stamps. The data was used to inform oral presentations and a white paper on food deserts and staff said their experience with COGIS helped them understand the value of mapping.\textsuperscript{13}

— In Columbia, Mo., the project team mapped the location of native fruit trees and community gardens, especially where there was a substantial amount of public housing. The goal was to raise community awareness about the value of these and other urban agricultural resources.\textsuperscript{14}

**Communications Results**

- Practicable Legacy Strategies developed a special issue of the *American Journal of Preventive Medicine* (spring 2012) on using spatial mapping to improve health

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\textsuperscript{11} Grant ID# 66808; $360,000 from December 1, 2009 to December 31, 2013

\textsuperscript{12} Grant ID# 66762; $360,000 from December 15, 2009 to December 14, 2013

\textsuperscript{13} Grant ID# 66760 $358,762 from December 15, 2009 to December 14, 2013

\textsuperscript{14} Grant ID# 65622; $400,000 from December 1, 2008 to November 30, 2012
and promote interdisciplinary approaches to reducing childhood obesity. See the Bibliography for article titles. The consultants also produced several reports for internal RWJF use, including:

— “Leveraging the RWJF Childhood Obesity GIS and Six Policy Priority Strategies to Halt the Childhood Obesity Epidemic”

— “Building and Sustaining the RWJF Childhood Obesity GIS”

— “Childhood Obesity Geographic Information System Priorities Paper”

- **Community Initiatives created tools supporting COGIS users**, including:
  
  — A COGIS overview, a Mapping Tool Quick Reference Guide explaining the use of the toolbar and menu, and a Mapping Exercise illustrating the system’s basic functions
  
  — Upload Tabular Data Tips and a webinar on uploading and integrating data into COGIS, and a PowerPoint™ presentation on using data from the American Community Survey and the U.S. Census
  
  — Training videos, including ones that describe advanced GIS techniques and provide case studies

**LESSONS LEARNED**

1. **Provide enough time to design a complex online system.** After RWJF moved COGIS from the University of Florida, CARES had just three months to launch the website. Project staff did not have enough time to discuss the system’s design with RWJF staff and end users. (CARES report to RWJF)

2. **Align all facets of a GIS project, including development, implementation, training, and user support.** While CARES launched COGIS, Practicable Legacy Strategies managed training, user support, and communications. Both Practicable Legacy Strategies and CARES found it challenging to manage only some aspects of the project, but noted that RWJF helped clarify roles and expectations. (CARES report to RWJF)

3. **Do not underestimate the need for training and technical assistance to ensure broad use of GIS.** As noted, Community Initiatives, under a subcontract and with guidance from Practicable Legacy Strategies, provided extensive onsite and web-based training for users of the system. (CARES report to RWJF)

4. **Educate users on the security features and value of GIS.** Local RWJF grantees often represent an array of community groups, which sometimes collect sensitive

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data. Practicable Legacy Strategies and University of Florida staff had to convince those grantees that the project would protect sensitive information and limit access to it. (University of Florida report to RWJF)

Some RWJF grantees also did not understand the value of COGIS early on. National program offices, such as that for Healthy Kids, Healthy Communities, helped staff develop fruitful relationships with local leaders. (University of Florida report to RWJF)

**AFTERWARD**

CARES continues to maintain COGIS and update and expand its national databases. The center has not provided strong user support or training for COGIS since its final RWJF grant closed in September 2012. But, said Fulcher, “We haven’t turned off the lights. People can still access COGIS, and we will certainly answer questions.”

CARES anticipates offering the system to a broader audience, but has not yet found funding or won RWJF approval to do so. “With a flip of the switch, COGIS can be available to the public,” Fulcher noted. “Our aspiration has always been to make COGIS a publicly available system.”

**Making the System More User Friendly**

Fulfilling that goal entails a broader challenge, said Fulcher: “How do we take COGIS to the next level?” Right now, “COGIS is like a stick-shift car. It is difficult, you have to pay attention.” Potential users tell CARES, “‘We want an automatic BMW.’

“It is a good analogy that gets to the complexity of this system. There are lots of data, lots of tools, ways people can collaborate, but that richness also makes it more complicated. So how do we make this a user-centered design? How do we tell stories? How do we make it easier for people to navigate to what they need?”

Toward that end, in July 2013 RWJF funded CARES to redesign the web interface to make it accessible to casual users.16 The plans also call for redesigning the collaborative management system, developing new tools for integrating narrative and visuals to enhance storytelling, and providing technical assistance to users.

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16 Grant ID# 70839; $675,000 from July 1, 2013 to December 31, 2014. The grant will be used to enhance COGIS by (1) improving the GIS mapping interface, security protocols, and onboarding process; (2) developing the ability to create stories with interactive maps, images, documents, and video that are embedded and linked directly in the story itself (“hypercontextualized narratives”) and to connect to other websites and databases (“interoperability”); (3) providing targeted technical assistance and data-uploading services to users; (4) and analyzing spatial data. Many of the COGIS 2.0 functionalities will also be publicly available. CARES describes two categories of COGIS users. Some 95 percent are individuals and organizations seeking maps, reports, and other products for use in planning and advocacy. Some 5 percent are “super-users” seeking more in-depth products for a range of research, advocacy, and educational efforts. The redesign is intended to make COGIS easier for the more casual users.
CARES and RWJF are also exploring ways to reach a larger share of people working to reverse childhood obesity by linking to other websites and databases. For example, COGIS and PreventObesity.net, an RWJF-funded national network, could collaborate to make the two platforms interoperable and create new opportunities for local action.

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# APPENDIX

## COGIS Advisory Council

(Current as of the end date of the program; provided by the program’s management; not verified by RWJF.)

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BIBLIOGRAPHY

(Current as of date of the report; as provided by the grantee organization; not verified by RWJF; items not available from RWJF.)

Articles

American Journal of Preventive Medicine, 42(5), May 2012. Abstract of the issue available online, with a link to the journal, where full-text articles are available for a charge. Abstracts of individual articles are available online as noted below.


Communication or Promotion

www.childhoodobesitygis.org. Click the Help tab to find links to training materials, training videos, and other resources.